

# Armed Forces College of Medicine AFCM



# Development of Mouth, Palate, Tongue & Salivary Glands

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**Ass. Prof of Anatomy** 

#### **INTENDED LEARNING OBJECTIVES (ILO)**



By the end of this lecture the student will be able to:

- 1. Explain the prenatal development of mouth , palate, tongue and salivary glands
- 2. Predict the causes and features of the congenital anomalies of mouth, palate, tongue and salivary glands

New Five Year Program GIT Module

#### **Key points**



1.Development of palate & its

congenital anomalies

2. Development of tongue & its

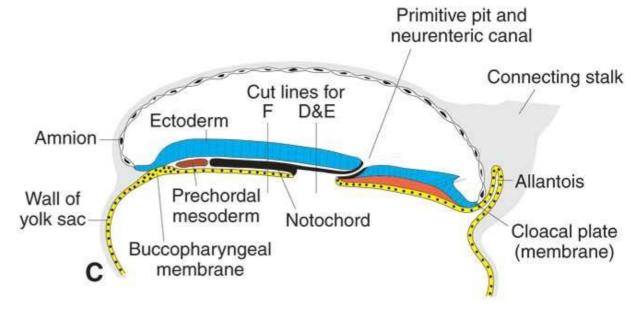
congenital anomalies

3. Development of salivary glands

# Folding and Development of pharyngeal arches®

• At the 3<sup>rd</sup> week the embryonic disc is formed of 3 germ layers: ectoderm, endoderm and mesoderm in between.

 The ectoderm and endoderm are separated by mesoderm except cranially (buccopharyngeal membrane) and caudally (cloacal membrane)



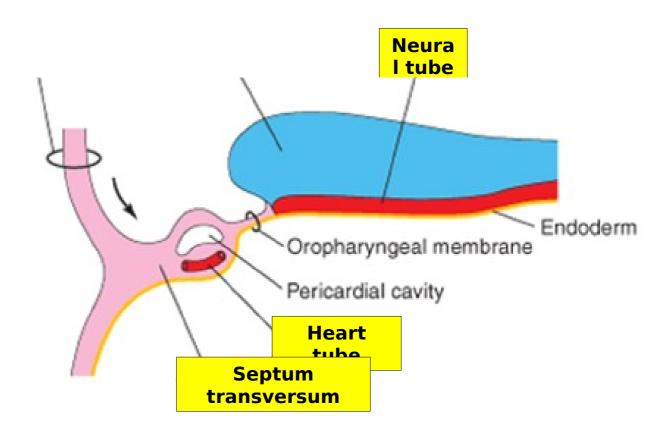
- Langman's Medical Embryology,9th edition

## Folding and Development of pharyngeal arches(9)



 The ectoderm gives rise to the neural tube (the **future CNS)** 

 Cranial to the buccopharyngeal membrane the mesoderm forms the heart tube (the future heart) and the septum trasversum (future diaphragm)

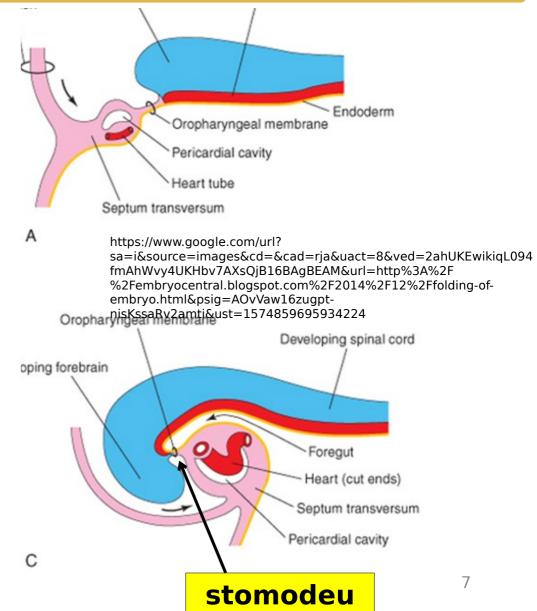


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#### **After Folding**



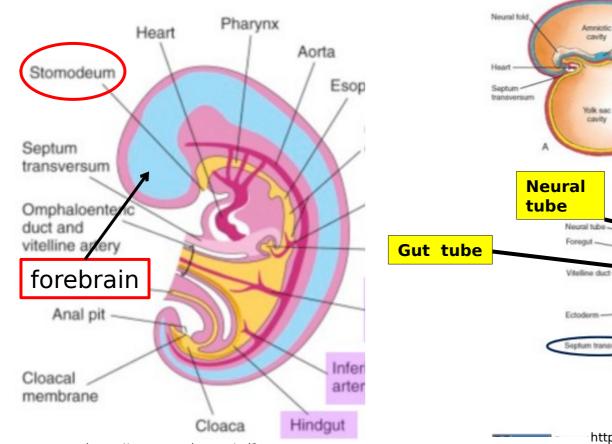
- The forebrain becomes the most cranial part of the embryo.
- The buccopharyngeal membrane is cranial to the septum transversum and heart.
- Most of the endoderm becomes invaginated into the embryo forming the gut tube. The proximal part of which will form the primitive pharynx.
  - An ectodermal depression is developed (The stomodeum) at less the



# Folding and Development of pharyngeal arches()

cavity





Vitelline duct-Ectoderm-Septum transv Yolk sac cavity https://www.google.com/imgres?imgurl=https%3A%2F

Septum' transversur

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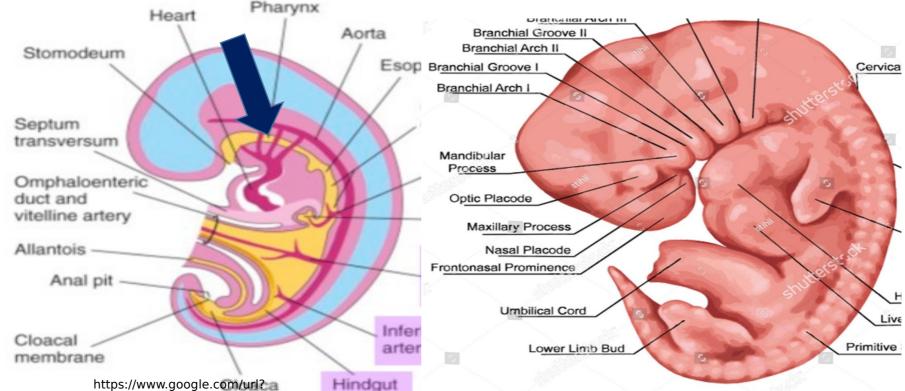
Yolk sac cavity

#### **Pharyngeal Arches**



They are 6 elevated bars that develop around the region of the primitive pharynx, during the 4<sup>th</sup> & 5<sup>th</sup> weeks,

The 5<sup>th</sup> arch disappears early with no remnants.



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#### **Pharyngeal Arches**

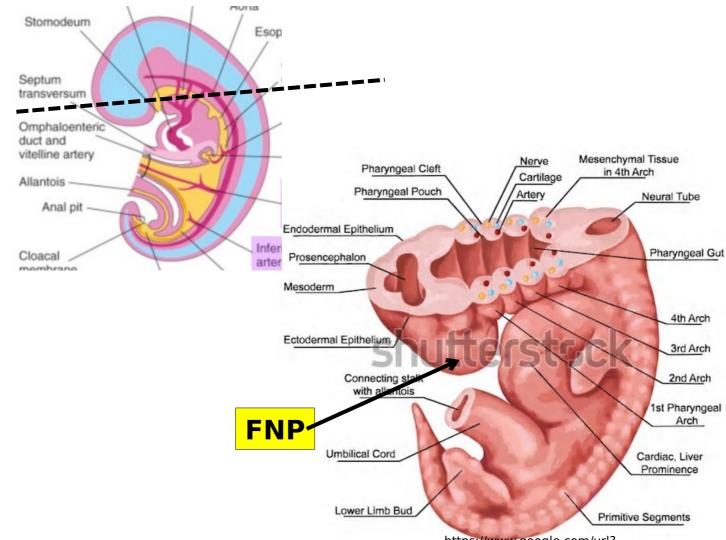
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# They develop due to:

1- proliferation of the underlying mesoderm 2 - migration of neural crest cells.

The mesoderm above the stomodeum and ventral to the forebrain develops the frontonasal prominence. (FNP)



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#### **Pharyngeal Arches**



The arches are separated externally Ectodermal Epithelium by pharynge al clefts and internally

by

Mandibular Arch Hyoid Arch Thyrohyoid Arch Unnamed Mesenchymal Tissue Pharyngeal Cleft in 4th Arch Cartilage Pharyngeal Pouch Neural Tube Endodermal Epithelium Prosencephalon Mesoderm Ph.cleft 4th Arch 3rd Arch Pharynge Connecting stalk 2nd Arch with allantois (Superior A 1st Pharyngeal **Umbilical Cord** Cardiac Liv Promi Ph.pouch Lower Limb Bud Primitive Segments https://www.google.com/urf.com · 180856136 sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwij-Neural Tube 8LfhojmAhUPXRoKHfnJApcQjB16BAgBEAM&url=https%3A%2F phary%2fwww.ehutterstock.com%2Fimage-vector%2Fformation-branchial-pharyngeal-

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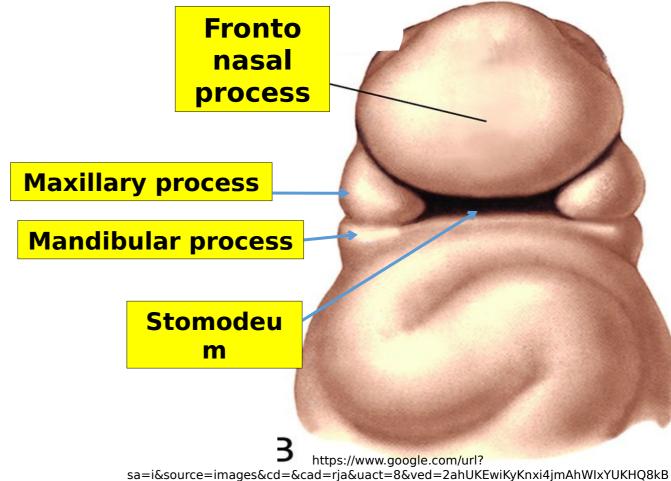
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#### **Development of Mouth**



• The mouth is formed following breakdown of the buccopharyngeal membrane and continued with the pharynx



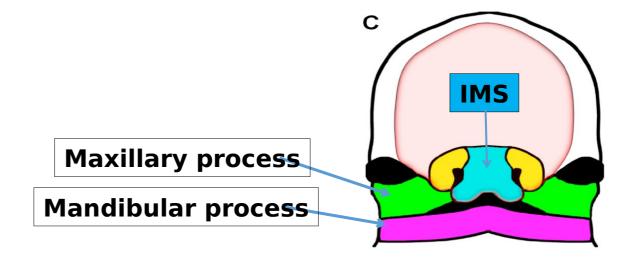
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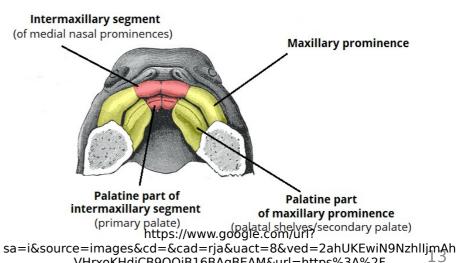
#### **Development of Palate**



(From the 5<sup>th</sup> - 9<sup>th</sup> w)

- It develops from:
- 1- The 1ry palate: arise from the inter-maxillary segment (IMS) & gives ant. 1/3 of hard palate
- 2- The 2ry palate: arise from 2 palatine shelves originate from maxillary process of the 1st arch & gives post. 2/3 of hard palate + soft palate + uvula.

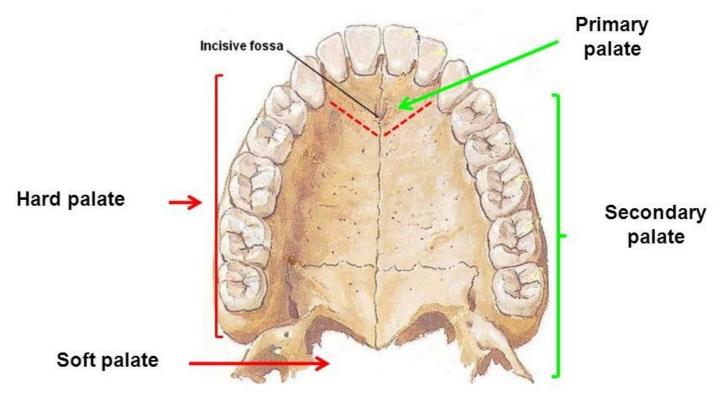




#### **Development of Palate**



The land mark between the 1ry and 2ry palate is the incisive fossa of the skull.



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#### **Development of Palate**







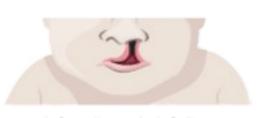


normal lip

normal palate

cleft palate

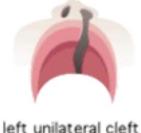
Anomalies (Cleft Palate) (1:2500)



left unilateral cleft lip



left cleft lip



lip and palate



bilateral cleft lip and palate



bilateral



bilateral cleft lip with full palate

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#### **Lecture Quiz**



- •The 1ry palate is developed from:
- a) Mandibular process
- b) Intermaxillary segment
- c) stomodeum
- d) Maxillary process



#### The mucosa:

#### 1- The anterior 2/3:

From the 1st arch supplied by lingua By fusion of 3 swellings:

- Median tuberculum impare
- 2 Lateral lingual swellings

If they fail to fuse= bifid tip of tong

Tuberculum impar Lat. lingual swelling Body of tongue Terminal sulcus Foramer cecum Palatine Copula Laryngeal (hypobranchial Root of orifice emin en ce tongue Arvtenoid **Epiglottis** swellings Epiglotta!

the linglogingival groove free me

at a median frenulum.

-If the frenulum is too short =ankyloglossia

or tongue-tie.

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tongue from the floor of mouth and stops %2F2017%2E10%2E18%2Edovolopment of-palatine-tonsils tongue



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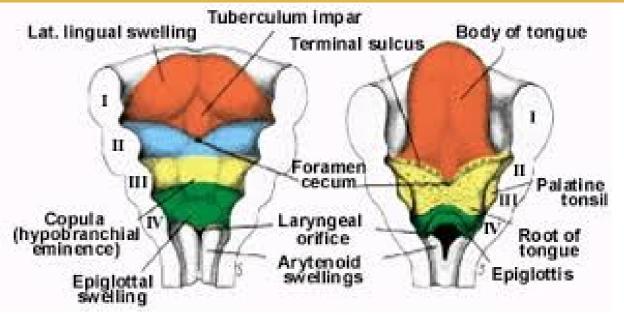
#### The mucosa:

#### 2- posterior 1/3:

- From the floor of the pharynx opposite to 2<sup>nd</sup>,3<sup>rd</sup> & 4<sup>th</sup> arches. supplied by the glossopharyngeal nerve
- Arise From hyponranchial eminence ( copula of His)
- -The two parts (ant 2/3& post 1/3) are separated by v-shaped sulcus terminalis.

#### 3- The most posterior part:

-From the copula of His opposite to the 4th arch -supplied by the superior laryngeal branch of vagus

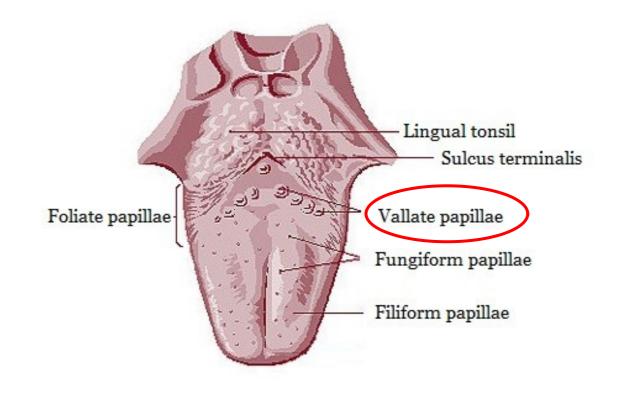


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The vallate papillae, located anterior to the sulcus terminalis, are supplied by the glossopharyngeal nerve. This indicates that they have migrated **forwards** 



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## Muscles of the tongue:

All muscles of the tongue develop from the occipital myotomes supplied by Hypoglossal nerve EXCEPT

palatoglossus muscle supplied by the cranial accessory indicating its origin from the 6th arch.

#### **Anomalies of the tongue**

**Bifid tongue** 

**Ankyloglossia** 

Microglossia

Macroglossia

#### **Lecture Quiz**



- •All muscles of the tongue are supplied by hypoglossal nerve except:
- a) Genioglossus
- b) Platoglossus
- c) Hyoglossus
- d) Styloglossus
  - Identify the anomaly and mention its

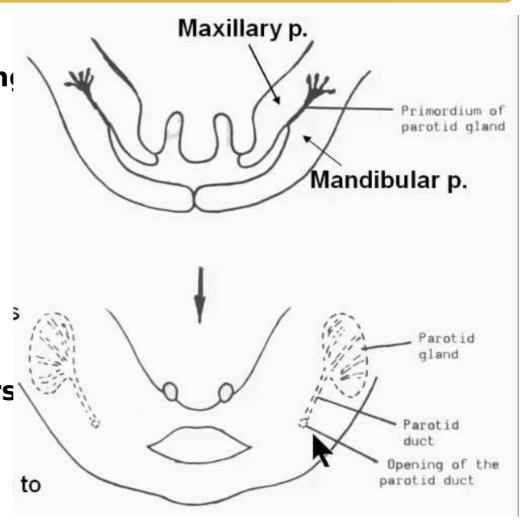


#### **Development of Salivary Glands**



#### **Parotid gland:**

- •It is the first gland to appear, in the beginning of the 6th week.
- •Begins as an ectodermal tube between the mandibular & maxillary processes of the 1<sup>st</sup> arch.
- distal end of the tube branches forming the gland while the tube itself forms the duct
- •Later the proximal part of the duct disappears and the duct opens at the vestibule of the mouth opposite to the upper 2<sup>nd</sup> molar teeth



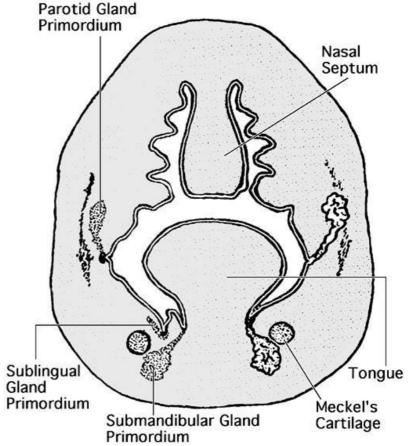
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#### **Development of Salivary Glands**



#### **Submandibular gland:**

- Appears at the end of the 6<sup>th</sup> week
- •Begins as an <u>ectodermal outgrowth</u> from the alveololingual groove.
- It grows caudally towards the lower jaw and branches.
- •The duct persists and acquire a lumen and opens at the floor of the mouth on both sides of the frenulum lingue.



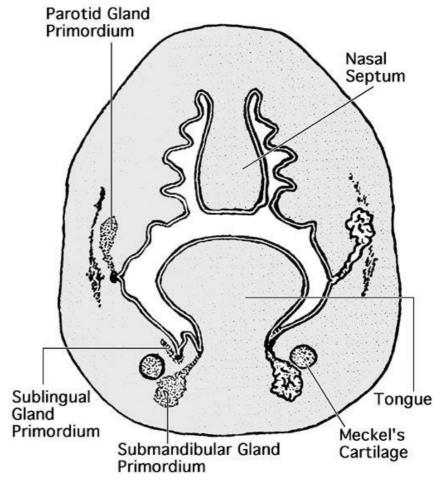
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#### **Development of Salivary Glands**



## **Sublingual gland:**

- Appears in the 8th week
- •Begins as solid epithelial buds from the alveololingual groove just lateral to the submandibular gland.



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#### **Lecture Quiz**



- •Development of the parotid glands starts in :
- a) 5<sup>th</sup> week
- b) 6th week
- c) 7<sup>th</sup> week
- d) 8th week

#### **Lecture Summary**





of Mouth,
Palate,
Tongue &
Salivary

Explain the prenatal development of mouth, palate, tongue and salivary glands

Predict the causes and features of the congenital anomalies of mouth, palate, tongue and salivary glands

# **SUGGESTED TEXTBOOKS**



- Langman's Medical Embryology,9th edition





New Five Year Program GIT Module 28